

CLAIMS

I claim:

- 1 1. A mobile hand held terminal for recognizing a user's identity during
2 an attempt to access the mobile terminal, comprising:
3 at least one camera directed toward the user's face and adapted to record at
4 least two still image of the user from at least first and second angles of view;
5 memory means for storing user profile information relating to authorized
6 users of a system; and
7 processing means connected to said at least one camera for processing the
8 still images obtained by said at least one camera and generating a 3-dimensional model of
9 the user's face and for comparing the generated model with the stored user profile
10 information to determine whether the user is authorized to access a system, said
11 processing means comprising means for granting access to the system when the
12 generated model matches the profile information of one of the authorized users stored in
13 the memory means, thereby indicating recognition and authorization of the user, and
14 means for updating the profile information of the one of the authorized users with the
15 generated model after each grant of access by said means for granting access such that
16 the updated profile information comprises an average of the generated model and the
17 previously stored profile information.
- 1 2. The mobile terminal of claim 1, further comprising a light source for
2 projecting light at the user's face.

1 3. The mobile terminal of claim 2, wherein said light source projects
2 structured light onto the user's face to facilitate the generation of the 3-dimensional model.

1 3. The mobile terminal of claim 1, wherein said at least one camera
2 comprises a charged couple device (CCD) camera.

1 4. The mobile terminal of claim 1, wherein said at least one camera
2 comprises a digital camera.

1 5. The mobile terminal of claim 1, wherein said memory means
2 comprises at least one selected from a group consisting of RAM, ROM, EPROM and a
3 magnetic storage media.

1 6. The mobile terminal of claim 1, wherein said processing means
2 comprises a computer, said memory means being contained within said computer.

1 7. The mobile terminal of claim 1, wherein said at least one camera is
2 adapted to obtain a 2-dimensional still image of the user's face, wherein the obtained 2-
3 dimensional still image of the user's face is used to determine the user's facial texture, the
4 determined facial texture being used in conjunction with the generated 3-dimensional
5 model to determine whether the user is authorized to access the system.

1 8. The mobile terminal of claim 3, wherein said light source comprises at
2 least one selected from a group consisting of white light, Laser light and infrared light.

1 9. The mobile terminal of claim 1, wherein said mobile terminal is a
2 mobile telephone.

1 10. The mobile terminal of claim 1, wherein said mobile terminal is
2 operatively arranged for transmitting the images to a server over a network and receiving a
3 3-dimensional model and a facial texture bit map from the server.

1 11. The mobile terminal of claim 1, further comprising means for
2 determining an orientation of the mobile terminal for determining an angle between said at
3 least first and second angles of view.

1 12. The mobile terminal of claim 1, wherein said at least one camera
2 comprises first and second cameras, said first camera adapted to record at least one still
3 image of the user from at least the first angle of view and said second camera adapted to
4 record at least one still image of the user from at least the second angle of view.

1 13. A mobile terminal for recognizing a user's identity when they are
2 attempting to access a system, comprising:

3 at least one charged coupled device (CCD) camera adapted to obtain at
4 least two still images of the user's face from at least two different predetermined angles of
5 view and to obtain at least one still image of the user's face;

6 memory means for storing user profile information relating to authorized
7 users of a system; and

8 processing means connected to said at least one CCD camera and said light
9 source for generating a 3-dimensional model of the user's face using the at least two still
10 images, and for generating a facial texture but map of the user's face using the at least
11 one still image, said processing means comparing the 3-dimensional model and the facial
12 texture bit map to the stored user profile information contained in said memory means and
13 enabling access to the system when the generated 3-dimensional model and facial texture
14 bit map match a user profile stored in said memory means.

1 14. The mobile terminal of claim 13, further comprising a light source for
2 projecting structured light on the user's face for use in obtaining said at least two still
3 images of the user's face.

1 15. The mobile terminal of claim 13, wherein said mobile terminal is a
2 mobile telephone.

1 16. The mobile terminal of claim 13, wherein said mobile terminal is
2 operatively arranged for transmitting the images to a server over a network and receiving a
3 3-dimensional model and a facial texture bit map from the server.

1 17. A method for recognizing a user using a mobile hand held terminal
2 during an attempt to access the mobile terminal, comprising the steps of:

3 obtaining, by the mobile terminal, at least two 2-dimensional still images of
4 the user from at least two different angles of view;

5 sending the images to a server over a network;

6 generating, by the server, a 3-dimensional model of the user's face from the
7 obtained images;

8 determining, by the server, the user's facial shape using the generated 3-
9 dimensional model;

10 sending the 3-dimensional model and the user's facial shape to the mobile
11 terminal;

12 comparing, at the mobile terminal, the determined facial shape with profile
13 information stored in memory, the profile information comprising data relating to the facial
14 shape of authorized users; and

15 determining, at the mobile terminal whether the determined facial shape
16 matches the profile information stored in the memory.

1 18. The method of claim 17, wherein the mobile terminal is a mobile
2 telephone.